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CHANNEL-SELECTION DEVICE AND CHANNEL-SELECTION METHOD FOR A
BROADCAST RECEIVER

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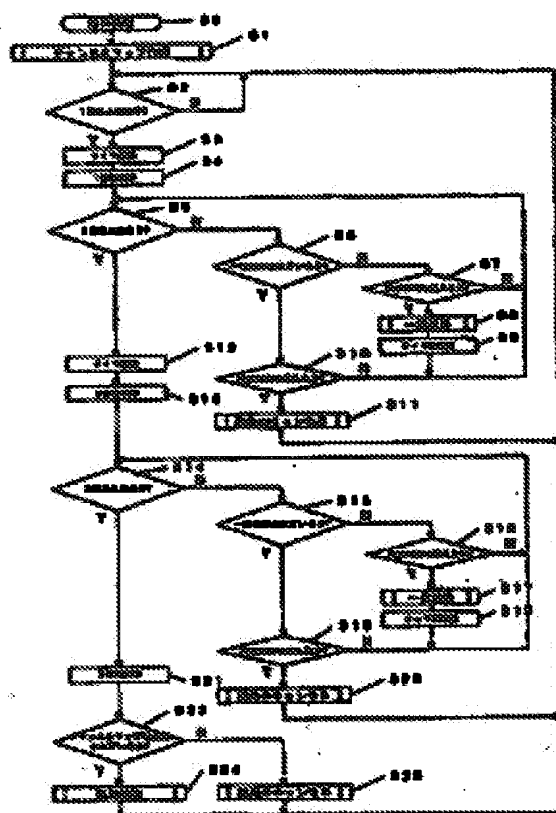[There are no amendments to this patent.]

Abstract
Purpose
 To provide a type of channel-selection device and a channel-selection method for tuning a broadcast receiver characterized by the fact that when a channel number list is displayed on the screen after a prescribed time has elapsed since key input, simple and correct channel-selection

can be performed even for a channel whose number is not memorized, and a channel whose number is memorized can be tuned into more quickly than with the conventional input method.

Constitution

In S7 and S16, if the time elapsed since key input by the user exceeds the first preset time (for example, 5 sec) (Y), in S8 and S17, all of the channel numbers registered in the channel map that correspond to the channel number for which the user has completed partial input of the digits of a multi-digit channel number are displayed on the screen as a channel list.

Key: S0   Channel-selection processing
      S1   Formation of the channel map
      S2   First-digit input?
      S3   Timer start
      S4   Display of first digit
      S5   Second-digit input?
      S6   Is list displayed?

S7   Has the prescribed time been exceeded?
S8   List display
S9   Restart timer
S10   Has the prescribed time been exceeded?
S11   Cancel channel-selection
S12   Timer start
S13   Second-digit display
S14   Third-digit input?
S15   Is list displayed?
S16   Has the prescribed time been exceeded?
S17   List display
S18   Timer restart
S19   Has the prescribed time been exceeded?
S20   Cancel channel-selection
S21   Third-digit display
S22   Registered in channel map?
S23   Cancel channel-selection
S24   Channel-selection processing

Claims

1. A type of channel-selection device for a broadcast receiver characterized by the following facts:

the broadcast receiver has

a tuner that selects the desired transport stream from the transmitted digital broadcast signal,

a DEMUX that tunes to the prescribed channel from said desired transport stream to obtain an MPEG video signal,

an MPEG decoder that decodes said MPEG video signal to obtain a video output signal,

a display output part that mixes the selected channel number or other channel-selection data with said video output signal and outputs the signal,

a memory that stores the channel map and the channel-selection data, etc., input by the user based on the program information obtained from said transport stream,

and a control part that controls the channel-selection operation;

in this broadcast receiver,

said control part has a channel list display means that selects all of the channels with channel numbers registered in the channel map that correspond to the channel number input by the user and displays them as a channel list when the user has completed partial input of the digits of multi-digit channel number.

2. The channel-selection device for a broadcast receiver described in Claim 1 characterized by the fact that the channel list is displayed after a prescribed time has elapsed since the user has completed partial input of the digits of a multi-digit channel number.

3. A channel-selection method for a broadcast receiver characterized by the following facts:

the broadcast receiver has

a tuner that selects the desired transport stream from the transmitted digital broadcast signal,

a DEMUX that tunes to the prescribed channel from said desired transport stream to obtain an MPEG video signal,

an MPEG decoder that decodes said MPEG video signal to obtain a video output signal,

a display output part that mixes the selected channel number or other channel-selection data with said video output signal and outputs the signal,

a memory that stores the channel map and the channel-selection data, etc., input by the user based on the program information obtained from said transport stream,

and a control part that controls the channel-selection operation;

in this broadcast receiver there is an operational step for a channel list display in which said control part selects all of the channels with channel numbers registered in the channel map that correspond to the channel number input by the user and displays them as a channel list when the user has completed partial input of the digits of a multi-digit channel number.

4. The channel-selection method for a broadcast receiver described in Claim 3 characterized by the fact that the channel list is displayed after a prescribed time has elapsed since the user completed partial input of the digits of a multi-digit channel number.

Detailed explanation of the invention
[0001]
Technical field of the invention

The present invention pertains to a television receiver, satellite broadcast decoder, ground wave digital broadcast decoder, or other broadcast receiver. In particular, the present invention pertains to a channel-selection device and a channel-selection method of the broadcast receiver characterized by the fact that it allows easy and reliable selection of a desired channel from among plural broadcast channels.

[0002]
Prior art

Figure 1 is a block diagram illustrating an example of the constitution of a broadcast receiver. As shown in Figure 1, the transmitted digital broadcast signal is received by antenna (1) and it is sent to tuner (2) in broadcast receiver (10). Said tuner (2) selects the desired transport stream and sends it to DEMUX (3) under the control of control part (6). Under the control of control part (6), DEMUX (3) selects the desired channel from the transport stream, and obtains the MPEG video signal and audio signal. MPEG decoder (4) decodes the encoded MPEG video signal sent from DEMUX (3) to obtain a video output signal and sends it to display output part (5). Said display output part (5) mixes the channel-selection data, such as the selected channel number or the like, with the video output signal and outputs the obtained mixed signal to display device (12), so that the image and the channel number are displayed on the screen.

[0003]
The user sends the channel-selection data from remote control transmitter (11) via remote control input part (9) to control part (6). Said control part (6) is composed of the well-known microcomputer or the like. The channel-selection data is stored in memory (8), and based on the channel-selection data and the channel map stored in memory (8), the desired channel is selected and a channel-selection instruction is sent to tuner (2) and DEMUX (3). Also, control part (6) obtains the program information (SI: Service Information) from the transport stream in DEMUX (3), converts it to a channel map that can be processed easily, and stores it in memory (8). Also, timer (7) measures the time elapsed since control part (6) received the instruction from remote control transmitter (11).

[0004]
Figure 4 is a flow chart illustrating the channel-selection method in the prior art. Figure 5 is a diagram illustrating the display on the screen in the conventional channel-selection method. They will be explained together. In order to simplify the explanation, assume that the channel number has 3 digits, and the channel number is input directly for direct channel-selection. As an example shown in Figure 5(A), in the following explanation, assume that the 215th channel-is to be selected, starting from the currently-selected 200th channel.

[0005]
As shown in Figure 4, when channel-selection processing is started (S0: step 0), the service information is obtained beforehand to form a channel map (S1: step 1). Then, whether a first digit is input to remote control input part (9) shown in Figure 1 is monitored (S2: step 2). If

a first digit is no input (N: NO), monitoring of the input of the first digit is continued as is. On the other hand, if there is an input of the first digit (Y: Yes), timer (7) in Figure 1 is turned ON to start counting (S3). Then, as shown in Figure 5(B), the input of the first digit of the channel number (2, for example) is displayed on the screen (S4), and the standby state is entered awaiting input of the second digit.

[0006]
Then, whether a second digit is input is monitored (S5). If there is no input of a second digit, a judgment is made as to whether the time elapsed since timer (7) was started in S3 exceeds a prescribed time (for example, 10 sec) (S10). If the prescribed time has not been exceeded (N), the operation returns to S5, and monitoring for input of the second digit continues. On the other hand, if the prescribed time has been exceeded (Y), it is judged that there is no intent to select a channel, the channel-selection is cancelled (S11), and process flow returns to S2. In S5, if is input a second digit (Y), timer (7) is restarted (reset to restart counting) (S12). Then, as shown in Figure 5(C), input of the second digit (for example, 1) of the channel number is displayed on the screen together with the first digit (S13).

[0007]
Then, whether a third digit is input is monitored (S14). If there is no input of the third digit, a judgment is made as to whether the time elapsed since timer (7) was started in S12 exceeds a prescribed time (for example, 10 sec) (S19). If the prescribed time has not been exceeded (N), the operation returns to S14, and monitoring for input of the third digit continues. On the other hand, if the prescribed time has been exceeded (Y), it is judged that there is no intent to select a channel, the channel-selection is cancelled (S20), and process flow returns to S2. In S14, if is input a third digit (Y), a third digit input (for example, 5) of the channel number is displayed on the screen together with the first digit and the second digit (S21), as shown in Figure 5(D).

[0008]
A judgment is then made as to whether the input 3-digit channel number is registered in the channel map in memory (8) shown in Figure 1 (S22). If it is not registered in the channel map (N), the process for cancelling channel-selection is carried out (S23), and process flow returns to S2. On the other hand, if it is registered in the channel map (Y), tuner (2) and DEMUX (3) are controlled to perform actual channel-selection processing (S24), and process flow returns to S2.

[0009]
Problems to be solved

As the format is changed from analog broadcasting to digital broadcasting, it becomes possible to obtain 100 or more channels, and 3 or more digits will be required as the channel numbers to be used as channel-selection data. The user must memorize the channel numbers of channels that are frequently watched/listened to. However, it is often hard to memorize the channel numbers for the channels that are seldomly used are. In this case, as illustrated by the flow chart shown in Figure 4, if the user inputs an incorrect channel number by using the ten numbered keys on the remote control, because the channel is not registered in the channel map, the channel selection is cancelled and the desired station cannot be tuned in. This is undesirable.

[0010]
Also, in order for the user to search for the correct channel number, it is necessary to display the program table or other information. Consequently, the operation becomes complicated, and channel-selection takes a long time. This is also undesirable. The objective of the present invention is to solve the aforementioned problems of the prior art by providing a type of channel-selection device and a channel-selection method for a broadcast receiver characterized by the fact that the channel number list is displayed on the screen after a prescribed time has elapsed since key input, so that channel-selection can be performed easily and correctly, even for the channels whose numbers are not memorized. On the other hand, for the channels whose numbers are memorized, channel-selection can be performed quickly using the conventional input method.

[0011]
Means to solve the problems

In order to realize the aforementioned objective, the present invention provides: (1) A type of channel-selection device for a broadcast receiver characterized by the following facts: the broadcast receiver has a tuner that selects the desired transport stream from the transmitted digital broadcast signal, a DEMUX that tunes to the prescribed channel from said desired transport stream to obtain an MPEG video signal, an MPEG decoder that decodes said MPEG video signal to obtain a video output signal, a display output part that mixes the selected channel number or other channel-selection data with said video output signal and outputs the signal, a memory that stores the channel map and the channel-selection data, etc., input by the user based on the program information obtained from said transport stream, and a control part that controls the channel-selection operation; in this broadcast receiver, said control part has a channel list display means that selects all of the channels with channel numbers registered in the channel

map that correspond to the channel number input by the user and displays them as a channel list when the user has completed partial input of the digits of a multi-digit channel number. (2) A channel-selection method for a broadcast receiver characterized by the following facts: the broadcast receiver has a tuner that selects the desired transport stream from the transmitted digital broadcast signal, a DEMUX that tunes to the prescribed channel from said desired transport stream to obtain an MPEG video signal, an MPEG decoder that decodes said MPEG video signal to obtain a video output signal, a display output part that mixes the selected channel number or other channel-selection data with said video output signal and outputs the signal, a memory that stores the channel map and the channel-selection data, etc., input by the user based on the program information obtained from said transport stream, and a control part that controls the channel-selection operation; in this broadcast receiver there is an operational step for channel list display in which said control part selects all of the channels with channel numbers registered in the channel map that correspond to the channel number input by the user and displays them as a channel list when the user has completed partial input of the digits of a multi-digit channel number.

[0012]
Embodiment of the invention

Figure 2 is a flow chart illustrating the channel-selection method of the present invention. Figure 3 is a diagram illustrating the channel-selection method and screen display of the present invention. They will be explained together in the following. Just as in the prior art, it is assumed that the channel number has 3 digits, and the channel number is input directly for direct channel-selection. As an example, as shown in Figure 3(A), it is assumed that the 215th channel is to be selected starting from the currently received 200th channel.

[0013]
As shown in Figure 2, after the start of the channel-selection processing (S0: step 0), the service information is acquired beforehand, and a channel map is formed (S1: step 1). Then monitoring of input of the first digit to remote control input part (9) shown in Figure 1 is performed (S2: step 2). If there is no input of the first digit (N: NO), monitoring of input of the first digit is continued as is. On the other hand, if the first digit is input (Y: Yes), timer (7) is turned ON to start counting (S3). Then, as shown in Figure 3(B), input of the first digit of the channel number (for example, 2) is displayed on the screen (S4), and standby state is entered awaiting input of the second digit.

[0014]

Then, whether a second digit is input is monitored (S5). If there is no input of the second digit, a judgment is made as to whether the channel list is displayed on the screen (S6). If the list is not displayed (N), a judgment is made as to whether the time elapsed since timer (7) was started in S3 exceeds a first prescribed time (for example, 5 sec) (S7). If it has not exceeded the prescribed time (N), the operation returns to S5, and monitoring of input of the second digit continues. On the other hand, if the prescribed time has been exceeded (Y), the channel list is displayed on the screen (S8), and timer (7) is restarted (reset to restart counting) (S9). Then, process flow returns to step S5.

[0015]

The channel list shown in Figure 3(C) lists all of the channel numbers registered in the channel map in memory (8) shown in Figure 1 that have the same first digit (for example, 2) as the first digit of the channel number input by the user, and displays for each channel, the channel number and the broadcast station name or a logo with a brief explanation of the content. The user uses this channel list as a reference when inputting the second digit.

[0016]

Then, when the list is displayed (Y) in S6, a judgment is made as to whether the time elapsed since timer (7) was started in S9 has exceeded a second prescribed time (for example, 10 sec) (S10). If the prescribed time has not been exceeded (N), the operation returns to S5, and monitoring of input of the second digit continues. On the other hand, if the prescribed time has been exceeded (Y), it is judged that there is no intent to select a channel, the channel-selection is cancelled (S11), and process flow returns to S5. In S5, if a second digit is input (Y), timer (7) is restarted (S12). Then, as shown in Figure 3 D), input of the second digit (for example, 1) of the channel number is displayed on the screen together with the first digit (S13).

[0017]

Then, a judgment is made as to whether a third digit is input (S14). If there is no input of the third digit, a judgment is made as to whether the channel list is displayed on the screen (S15). If the list is not displayed (N), a judgment is made as to whether the time elapsed since timer (7) was started in S12 exceeds a first prescribed time (for example, 5 sec) (S16). If prescribed time has not been exceeded (N), the operation returns to S14, and monitoring of input of the third digit continues. On the other hand, if the prescribed time has been exceeded (Y), the channel list is displayed on the screen (S17) as shown in Figure 3 (E), and timer (7) is restarted (S18). Then, process flow returns to step S14.

[0018]

The channel list shown in Figure 3(E) lists all of the channel numbers registered in the channel map in memory (8) shown in Figure 1 whose first two digits (for example, 21) correspond to the first and second digits of the channel number input by the user, and displays, for each channel the channel number and the broadcast station name or logo with a brief explanation of the content. The user uses this channel list as a reference when inputting the third digit.

[0019]

Then, when the list is displayed (Y) in S15, a judgment is made as to whether the time elapsed since timer (7) was started in S18 exceeds the second prescribed time (for example, 10 sec) (S19). If the prescribed time has not been exceeded (N), process flow returns to S14, and monitoring of input of the third digit is continued as is. On the other hand, if the prescribed time has been exceeded (Y), it is judged that there is no intent to select a channel, so that the process for cancelling channel-selection is carried out (S20), and process flow then returns to S14.

[0020]

Then, in S14, if is input a third digit (Y), as shown in Figure 3(F), the input of the third digit of the channel number (for example, 5) is displayed together with the first digit and second digit on the screen (S21). Then, a judgment is made as to whether the input 3-digit channel number is registered in the channel map in memory (8) shown in Figure 1 (S22). If it is not registered in the channel map (N), processing is performed to cancel channel-selection (S23), and process flow returns to S2. If it is registered in the channel map (Y), tuner (2) and DEMUX (3) are controlled to perform actual channel-selection processing (S24), and process flow returns to S2.

[0021]

As explained above, the first prescribed time and the second prescribed time are set. However, one may also adopt a scheme in which the first prescribed time is not set, and the channel list is displayed immediately. Also, in the aforementioned explanation, the first prescribed time and the second prescribed time are set as different times. However, one may also adopt a scheme in which said prescribed times are set the same. Also, when the channel list shown in Figures 3(C) and 3(E) is displayed, the number of channels is usually too large to be displayed as a single frame. In such cases, it is possible to display the channels on two or more frames, which can be switched by means of a cursor key or the like. Also, when the channel list

is displayed in S8 or S17, selection of the station can be performed by selection within the channel list using a cursor key or the like, followed by pressing the Enter key. Also, the input numerical digit may be changed by means of the channel up/down key, etc.

[0022]

As explained above, according to the channel-selection method and device of the present invention, even if the channel number is not remembered correctly, the desired channel can still be selected easily and correctly. In addition, because the first prescribed time (for example, 5 sec) is set as the period from the input of the channel number via the ten numerical keys to the display of the channel list, when a channel is desired that is frequently watched/listened to and whose channel number has been memorized, the ten numerical keys can be used to make a rapid input (for example, within 5 sec), so that there is no need to display the channel list, which entails a considerable processing load. Channel-selection can be performed conventionally in these situations, and this is highly convenient.

[0023]
Effect of the invention

According to the channel-selection device and channel-selection method of the broadcast receiver of the present invention, the channel number list is displayed on the screen after a prescribed time has elapsed since key input. Consequently, even a channel number that has not been memorized can be set easily and correctly. On the other hand, channel numbers that have been memorized can be set quickly using the conventional input method. Consequently, the effectiveness is excellent.

Brief description of the figures

Figure 1 is a block diagram illustrating an example of the constitution of the broadcast receiver.

Figure 2 is a flow chart illustrating the channel-selection method of the present invention.

Figure 3 is a diagram illustrating the channel-selection method and screen display in the present invention.

Figure 4 is a flow chart illustrating the channel-selection method in the prior art.

Figure 5 is a diagram illustrating the channel-selection method and screen display in the prior art.

Explanation of symbols
2   Tuner

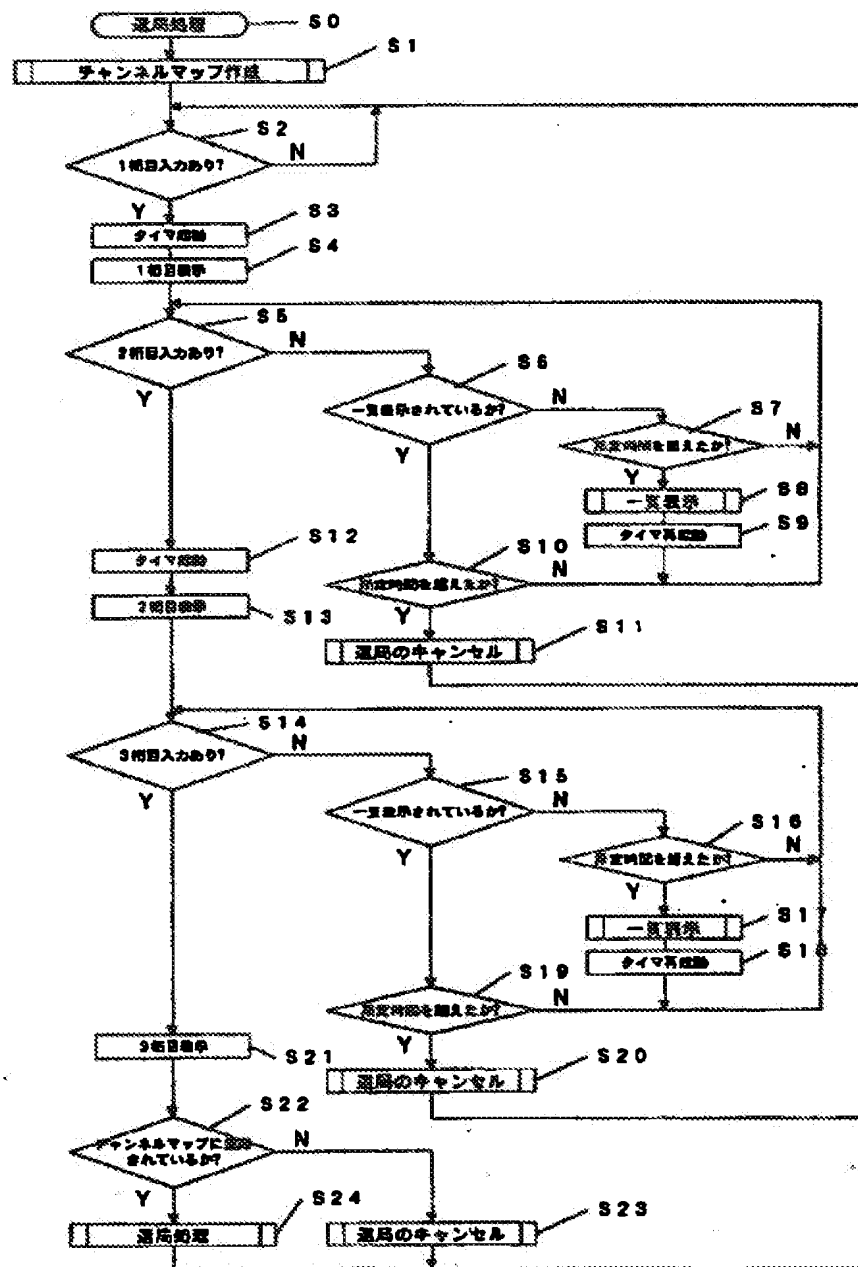| 3	DEMUX
4	MPEG decoder
5	Display output part
6	Control part
7	Timer
8	Memory
9	Remote control input part

Figure 1

13

Figure 2

Key:
Ss0 Channel-selection process
S1 Formation of channel map
S2 Is there input of a first digit?
S3 Start the timer
S4 Display the first digit

S5   Is there input of a second digit?
S6   Is the list displayed?
S7   Has the prescribed time been exceeded?
S8   Display list
S9   Restart the timer
S10   Has the prescribed time been exceeded?
S11   Cancel channel-selection
S12   Start timer
S13   Display second digit
S14   Is there input of a third digit?
S15   Is the list displayed?
S16   Has the prescribed time been exceeded?
S17   Display list
S18   Restart timer
S19   Has the prescribed time been exceeded?
S20   Cancel channel-selection
S21   Display the third digit
S22   Is it registered in the channel map?
S23   Cancel channel-selection
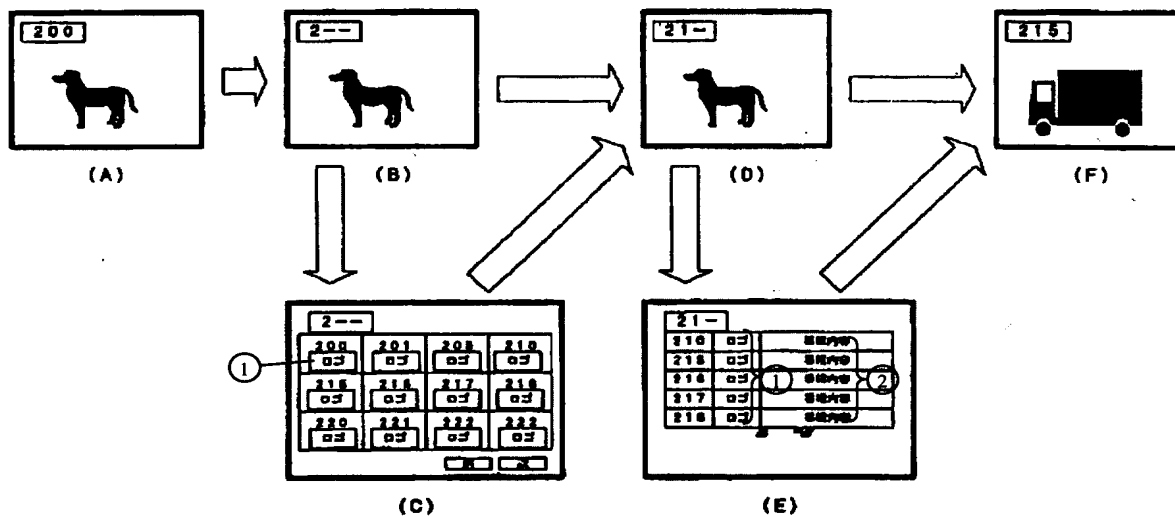S24   Channel-selection processing
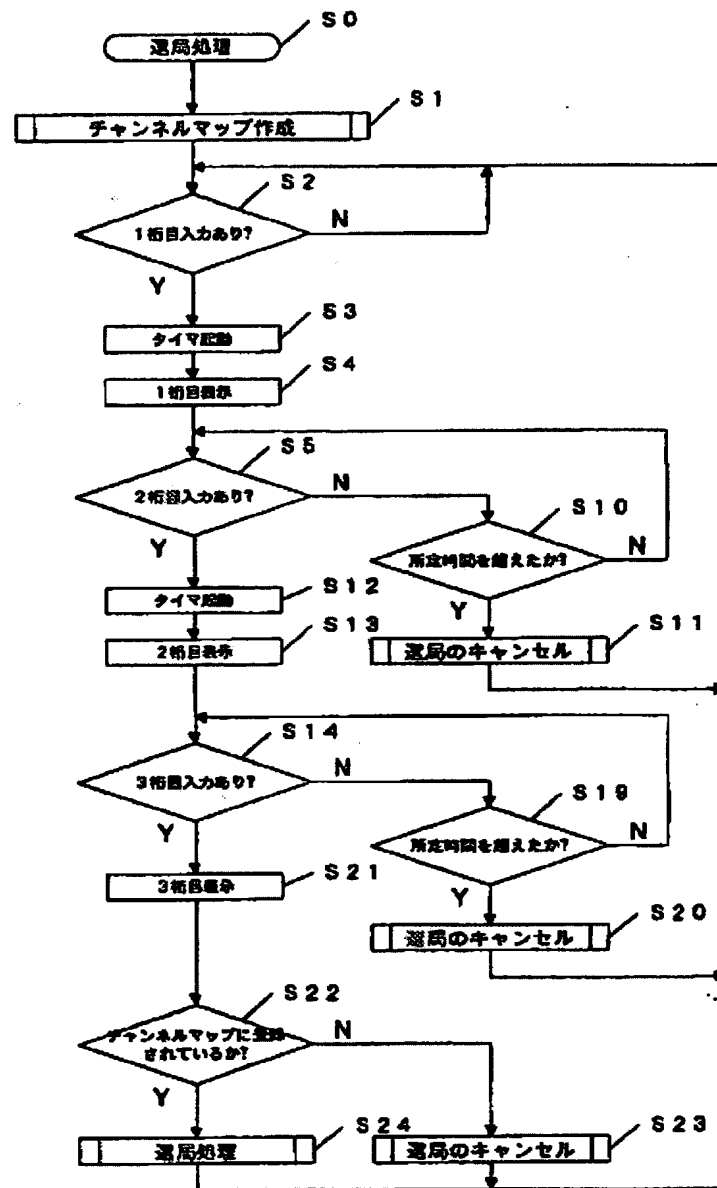

Figure 3

Key: 1   Logo
      2   Content of program

Figure 4

Key: S0   Channel-selection processing
      S1   Formation of channel map
      S2   Is there input of a first digit?
      S3   Start timer
      S4   Display the first digit
      S5   Is there input of a second digit?

S10   Has the prescribed time been exceeded?
S11   Cancel channel-selection
S12   Start timer
S13   Display the second digit
S14   Is there input of a third digit?
S19   Has the prescribed time been exceeded?
S21   Display the third digit
S22   Is it registered on the channel map?
S23   Cancel channel-selection
S24   Channel-selection processing